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An Essay on

Caries of the Spine

Accompanied by a Case:

Passed March 6. 1829

Submitted to the Medical faculty
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for the degree of
Doctor of Medicine
By Diller Luther
of Pennsylvania

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On

Caries of the Spine.

This disease is generally met with among infants or young children, though adults are by no means exempt from it. Percival Pott, who perhaps was more extensively acquainted with it than any one since the time in which he wrote, says, he "never saw it at an age beyond forty". The case of my father about which more will be said hereafter, so far as my information extends, is a solitary instance of its occurrence at an age beyond that designated by Mr. Pott. It is generally dependant upon a scrofulous taint of the system: but the same case mentioned above, besides being singular with regard to the period of life at which he became affected with it, is perhaps not less so in this respect;

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for he was naturally of a strong and robust constitution, having enjoyed uninterrupted good health until within the last five or six years; when the vigour of his constitution became impaired from severe and protracted visceral disease, Still however, it may be said to be confined to those, whose constitutions are enfeebled or broken down by previous disease; and the present instance, instead of militating against this conclusion, tends rather to confirm it, for, at the onset of the disease, he was manifestly in a feeble and debilitated state of health; and, although no well developed signs of a scrofulous diathesis could be said to exist in his system, it must not be denied, that this habit, strongly marked, exists in one of his offspring.

"Contusions and shocks from falls, sprains of the vertebral joints, rachitis, rheumatism, careless and habitual malpositions of the body, particularly during its growth, malformations or irregular and unnatural growth of bone, and muscular debility" may be enu-

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The symptoms of which the patient will complain when first attacked with it are, dull, obscure, deep-seated pains, generally in the dorsal vertebræ; though they are often met with in the cervical & lumbar. This pain, as it is described by authors, is not very severe; but in the case to which I have already alluded, it was constant, and often times so extremely tormenting, that, frequently, whilst partaking of a meal, he would be obliged to leave the table with his meal unfinished, and resort to the recumbent posture in order to relieve himself. It was compared by him to the "gnawing of a dog", and was always increased by exercise on horseback, or in a gig. There will be felt, at the same time, a coldness and a numbness, or an uneasy tingling sensation, in the lower extremities. The patient will complain of a tightness across the scrobiculus cordis, which is often compared to a band drawn

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firmly around the body. This symptom is owing to a commencing paralysis of the abdominal muscles. It is sometimes described as an oppression of breathing, tightness of the stomach, band tied round the belly, torpor of the abdomen, and by other expressions in different patients. The patient is much harassed with flatulency, the abdomen is much distended, and the respiration is affected. He will be particularly careful to create as little motion between the vertebral joints as possible: thus in stooping, he will be observed to separate his legs to some distance, and to reach down without subjecting the spine to much change in its position. To relieve himself of the superincumbent weight, which must of course increase the degree of pain felt in the diseased parts, he will be found, whilst sitting, to recline on his hands, with his elbows resting on his thighs. When he walks the upper part of the spine inclines forwards; he is unable to direct his

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steps with precision; his gait is slow, hesitating, and tottering; he is soon fatigued; he stumbles, trips, crosses his legs, and, if not guarded, falls. While seated, his legs will be almost always found across each other and drawn up under the seat. The limbs are frequently moved by involuntary twitchings, which are sometimes very troublesome during the night. The animal sensibility, temperature, and size of the lower extremities still continue to diminish; and the voluntary power, which the patient exercises over them, grows less and less, until they are completely paralysed. The patient is now incapable of leaving the bed; there is great want of action in the genital organs, and the power either of retaining, or discharging the faces and urine, is lost so that they come away involuntarily.

<u>Diagnosis.</u> There are few diseases that are more obscure, or more frequently mistaken than this, in its earliest state. 1st Because little pain is felt at the seat

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seat of the disorder; 2nd no inequality or deviation is manifest to the eye or touch; 3rd the irritation is often in the parietes or contents of the abdomen, in a transverse direction with the disease in the spine; producing dyspepsia, pyrosis, vomiting, tightness across the præcordia, &c. These, and other affections, consequent upon the primary disease in the spine, are not only painful, but so embarrassing, as entirely to engross the attention of both patient & physician. Hence the sufferer has been harassed by a long, continued course of demulcent, without gaining any permanent advantage; whereas, had remedial measures been directed to the immediate source of the mischief, a cure would, most probably, have been obtained.

When, therefore, the patient complains of a sense of tightness across the scrobiculus cordis; if his respiration is affected, if he is languid, and soon tired upon taking exercise; when pain is felt in the spinal

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column, and the limbs feel cold and numb, we should apprehend some serious disease, and immediately inspect the spine.

To distinguish the curvature resulting from caries, from that arising from mere relaxation of the muscles and ligaments of the spine I shall transcribe without further apology, the following excellent remarks by Dr. Alexander*

"That kind of curvature, which results from caries, as it is always marked by a sudden or angular distortion and the trunk is almost always thrown directly forwards in consequence of the bodies of one or more of the vertebra being destroyed by caries sometimes however, although but very rarely, the caries begins in the transverse or articulating process and in consequence of which the direction of the curvature is laterally, the trunk, I do not say I have one case of this latter kind of caries and then the suddenness of the distortion, taken in connection with the

* See his treatise on diseases, deformities and injuries of the spine & the medical

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other symptoms, rendered its nature at once evident. Now are those kinds of distortion of the spine which do not proceed from caries, are characterized by a mere curvature of the most distortid part in which no angular or sudden deviation from the natural direction can be discovered. The distortion is, moreover, almost universally, from side to side; and as two or more curvatures can be distinctly detected in different parts of the whole column, that contorted appearance, to designate which the term serpentine has been used by Mr. Shaw, is produced".

After some other remarks in connection with this subject, he goes on to say, that in "caries of the spine, there is always a tenderness, and often severe pain under the excitement both of motion and pressure. During the life of the patient, heat, swelling, and redness, are sometimes present in the surrounding soft parts; and on a post-mortem examination all the signs of vascular engorgement are

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exhibited in the affected vertebra and their included membranes and nerves.

Abscesses frequently form, in consequence of the discharge from the carious surface infiltrating into the cellular tissue; and as these are generally carried by gravitation to dependent and remote parts, so as to produce inguinal or femoral swellings, their connection with the caries is sometimes overlooked by practitioners. The most striking characteristic of this kind of disease, however, is the unilateral paralytic affection of the lower extremities, which Mr Pott rightly attributed to the vascular engorgement and inflammatory irritation of that portion of the spinal marrow included within the affected vertebrae. After some further remarks illustrative of this subject he thus concludes: "For the purpose of still further contra-distinguishing the simple distortions of the spine, from the disease characterized by the above circumstances, we need

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only observe, that they are not necessarily accompanied by pain, nor even tenderness under pressure; nor does motion, or exercise of any kind, ever prove injurious, except when carried to excess. Abscesses do not form in connection with such curvatures; nor does paralysis ever take place in the inferior extremities. The hectic irritation, which is always present in the last stage of caries, is also wanting in all cases of simple distortions.

The loss of voluntary power over the lower extremities, which is merely a symptom of the engorged state of the membranes of the spinal marrow, and the numbness of the nerves, likewise, renders this disease exceedingly liable to be mistaken for a true paralysis; But the febrile irritation, which is usually present in the incipient stage of caries, the constant lightness of the stomach together with other symptoms, resulting from the deranged state of the thoracic and abdominal viscera, might, in

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general, be sufficient to distinguish the two diseases. But, in order to render their diagnosis still more unambiguous, the state of the extremities themselves should be referred to:— the particular state of which, in each disease, is such, that the difference will at once be evident to the most careless observer. This difference, which was first so clearly delineated by Mr. Pott, is known, by the muscles in the thigh being soft, flabby, and unresisting, while in curvy, though bowed and attenuated in size, they are rigid and contracted, requiring considerable force either to flex or extend the leg.

The Prognosis may be regarded as favourable, when there is no scrofulous diathesis; when the patient is not too far advanced in years; and where the treatment is commenced in the early stages of the disease. If, in the course of the disease the patient be affected with inflammation

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of the pleura, dyspnoea, tubercula or vomica, which sometimes happens from the compression and alteration of figure, which the lungs may suffer, in consequence of the change in the form of the chest, the prognosis is unfavourable. When the caries is combined with the appearance of external abscess communicating with the diseased vertebræ, the termination must be looked upon as unfavourable, whether the abscess have the name of lumbar, psoas or any other appellation or situation. In such cases the general health and appetite fail; the digestive functions become impaired, and deranged; the patient becomes gradually emaciated, he is affected with hectic fever, and is generally carried off by diarrhœa.

When all spinal pain has ceased, and the digestive functions are improving, when, at the same time, the patient acquires flesh and spirits, re=

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over the muscular power of the extremities, is freed from dyspnoea, epigastric pain, and tightness; and from pain of the knees and steeks well; he may wholly, or in part, in a short time, recover.

Pathology. The diversity of opinion, which prevails as to the general principle which should govern us in the treatment of this complaint, is in a great measure to be attributed to the erroneous notions which are entertained of its proximate cause. It is, perhaps, not generally known, that those who are slightly conversant with spinal diseases are exceedingly prone to look upon the paralytic state of the lower extremities, as a primary disorder, and any remedies which they may make use of will consequently be directed to them with a view to cure the diseases, instead of to the spine, which is the real seat of the disorder.

We are enabled from the knowledge of this fact, to account for the unavailing attempts to cure

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this affection previous to the time of Pott: the ancients having treated it as a common palsy.

The disease may be said to consist in a slow or scrofulous inflammation of the organic vessels of the fibro-cartilaginous and osseous tissues of the vertebral apparatus, eventually running on to disorganization and necrosis, or caries of the osseous substance: which, by the irritation thus created, implicates the contiguous parts, as the spinal marrow and nerves with their investing membranes. The inter-vertebral cartilages are first decomposed or dissolved; to this effect, a portion or caries of the osseous substance, in corresponding points, soon succeeds: and developes itself, more or less rapidly, according to the intensity of the causes, the age, and idiosyncrasy of the individual: the caries rarely attacks the spinous or transverse processes.

The spinous processes, in consequence of the de=

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=struction of the inter vertebral cartilages, and of the process of absorption and of decomposition, which is going on in the bone, separate from each other, and give rise to the projection, which is to be observed in the course of the disease. The diseased vessels emit a purulent fluid, which first accumulates under the membranes, or investing ligamentous texture; afterwards it becomes extravasated through the cellular structure towards the most depending parts, or towards those where it meets with the least resistance; and accumulates at places more or less remote, where it produces what is called symptomatic abscess, or abscess by congestion.

From this state of the parts, we will easily be enabled to account for the symptomatic affections of the lower extremities, and of the deranged state of the thoracic and abdominal viscera. For such is the irritation, which is now created at

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the diseased points in the spine, that an increased flow of blood is invited into them, and their adjacent parts; the membranous coverings of the spinal marrow, and the neurilemma of the nerves, become engorged, and consequently, thickened by the volume of blood now propelled into them, the spinal cord and nerves are encroached upon by their respective envelopes, which, in consequence of their increased bulk, so compress or as it were, choke the cord and nerves, that the flow of nervous power to remote and dependant parts becomes in a great measure obstructed. thus giving rise to paralysis of the lower extremities, as well as to other parts of the body, and to the derangement of the digestive and respiratory organs.

From these premises, it will be observed, that we maintain the paralytic state of the lower limbs, to be independent of the malformation of the spine. If this useless state of the limbs was dependant, as

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is sometimes said, upon the deformity of the spine, the degree and extent of the curve would necessarily produce a corresponding variation in the symptoms; whereas Mr Pott says he "does not remember ever to have seen this useless state of the limbs from a mere malformation of the spine, however crooked such malformation may have been; but that the smallest is, when perfectly formed, attended with the same consequences as the largest." Although it is certain that a dislocation of any of the vertebra, would be attended with symptoms of a paralytic kind, yet they would be very unlike to those which affect the limbs in the present case.

What however we must consider conclusive on this subject, is, that we are often enabled to restore the functions of the limbs, without relieving the curvature of the vertebra.

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a diminished power over the muscles of the lower extremities together with other symptoms denoting a diminution of the nervous power, are often present too, before any curvature takes place; so that a morbid state of the spine, and of the spinal cord & mind, is the primary and original cause. The fibrous tissues, from the deficient organic sensibility with which they are naturally endowed are extremely tardy, in taking on the inflammatory action; but when once this state is induced in them, it is of a very intractable nature: and the consequences sometimes very serious. The practitioner should therefore, bear in mind that these characteristic properties of the fibrous tissue emphatically belong to the inflammation which commences in the inter-vertebral substances; and, in order that he may the more easily dispose it to take a prosperous course, he must apply his remedies in its incipient stage, when

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it may be regarded as a similar in cummalort affection. If a cure is not attempted before this stage has passed over, or until disorganization and caries, or erosion of the osseous substance, have taken place, it will certainly be commenced under very discouraging circumstances.

Treatment. Mr Pott not only gave the first accurate description of this disease, but also inculcated the proper mode of treating it. To him we are indebted for the knowledge of the efficacy of caustic issues. He proved, and the experience of all succeeding surgeons has proved, that a copious suppuration kept up for a long time in the subcutaneous cellular tissue, which surrounds the projecting part of the spine, is the surest and best remedy. It will always be found successful if employed before pus is formed, and it will always be found, that the patients die if it is neglected.

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I have already observed, that the symptoms which indicate its early stage are exceedingly vague and undefined; so that it often makes alarming progress before its existence is suspected. As it is of the greatest importance to discover it as early as possible, we should carefully examine every one, who complains of a sensation of pricking in the thighs, weakness of the lower extremities, an uneasy sensation across the stomach, and a constriction of the chest, which renders breathing difficult. The pain in the back is generally moderate, and not such as would lead you to suspect the existence of any very important disease. When these symptoms are present, we should carefully examine the spine by running the fingers over the spinous processes, and pressing firmly upon each; in this way, we may be enabled to discover the precise seat of the disorder, in as much as the patient will

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complain when pressure is made upon the affected vertebræ."

I called upon by a patient labouring under the symptoms shown in medicine, have him in the recumbent posture. The salutary effect of rest and position in all acute inflammatory complaints is well known; but it is far remarkable in this. Here the irritation about the diseased parts is not only increased by the incumbent weight, but also by the motion exercised by the irritated surfaces upon each other; and hence the utility of the recumbent posture, in taking off the weight sustained by these parts, and also of preventing motion which is so injurious in this particular case. To reduce vascular excitement, and congorgement of the vessels of the affected parts, venesection, and leeching, or cupping with scarification on each side of the spinal column, should be resorted to, and re=

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The caustic issues should immediately be established on each side of the excoriation: & these, to be efficient should be from two to four inches in length.

The part intended to be converted into an issue, should be accurately marked out by ink; or what may answer better by cutting in a piece of linen spread with adhesive plaster, an orifice corresponding with the shape and size of the issue which is intended to be established: this may not only serve as a guide for the application of the caustic, but also to protect the parts immediately around from its action. That portion of the integuments; thus included, should then be rubbed with the vegetable caustic until it has turned of a dull brown colour: a poultice should then be applied to the eschars in order to expedite their separation. As soon as the eschars

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are separated, or from a slight adherence they admit of being separated, we must confine some foreign substance in the issues for the purpose of keeping them open. Nothing will be found to answer this purpose so well as the orange peas. They seem to possess a slightly stimulating property, for an increased discharge always follows the use of fresh peas; which is not the case when they have been used, or when they are encrusted with lime. A row of peas, connected together with thread, should be laid in the sore, and confined by adhesive strips. [illegible] tendency of nature, that the issues often rapidly close, and hence it becomes necessary, that a frequent renewal of the caustic should be made, in order that they may be kept discharging. This frequent renewal of the caustic, is sometimes attended with the very best effects; increased warmth and sensibility, in the thighs, and a better control over the mus-

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-des of the lower extremities I have frequently observed to follow its use.

The unanimity, however, with which the vegetable caustic was for a time resorted to, in the cure of this complaint, has been somewhat broken by the flattering account which Baron Larrey gave of his "heroic remedy", the moxa. He says the "cauteries recommended by Pott in rachitis do not possess the advantages that he derived from the moxa. That the colliquative suppuration which this sort of cauteries occasions, weakens the patient very considerably, without producing the desired revulsion especially, if there be symptomatic abscesses. If these abscesses are opened early, before efficacious means have been employed against the cause, whatever may be the process, the patient dies very soon." Now, in the administration of these remedies, it is necessary to endeavour to stop the process of suppuration; it is sufficient to produce an excitement on the

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parts affected, to divert the morbific principle, and to change the vital properties of the inflamed parts. Moxa succeeded by cupping with scarification fulfils this double indication. A great number of patients whose situations were considered desperate, have owed their safety to this remedy."

*"The confidence with which this remedy is thus recommended, by one of our highest medical authorities, certainly, entitles it to the greatest confidence and respect. It most unquestionably is capable of doing much good in this complaint when properly and judiciously resorted to: but like most other new remedies, that are ushered into practice, it is prescribed without due regard being paid to the states or conditions of the system. If applied when the pulse is excited, skin hot, and cheeks flushed, which is usually the case in the commencement, the mischief, which

* See Larrey's Surgical Essays, page 57.

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will result from the constant excitement they keep up in the system, will, in general, overbalance any good which may be derived from them. When, however, this state of excitement has passed over, and stony, and ossification has supervened, the effects, which they produce, are highly beneficial. In addition to this the purgative system, which was first introduced into the treatment of this disease by our justly distinguished countryman Dr Physick, should be rigidly, pursued. Some, and those who have had to contend with this disease, can deny, whatever the virtue of this practice, that up and Cremor Tartar is preferred by him, and it produces its beneficial effects by bringing away the secretions of the intestines; thereby acting as a drain from the part. It should be given every other day, but it is apt by long continuance to disorder the stomach and bowels, so that it may become necessary to substitute some other in its stead.

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Rhubarb and Magnesia, with a little ginger, will answer this purpose exceedingly well.

Besides this, it is important that especial care should be paid to the general health. The vascular system must be kept in a calm and subdued state; the diet should be restricted and of easy digestion; and the compound decoction of Sarsaparilla: or the Syrup of Cuisinier, with a grain of corrosive sublimate added to each bottle (from its acknowledged utility in remedying obstinate diseases) may likewise be given with advantage. A salivation, however, should be guarded against, as the excitement, which will be kept up by the specific action of mercury, will in all cases do harm.

When the weather is favourable, and the general health does not forbid it, exercise in the open air in a recumbent posture, should be made use of.

It must be evident from the nature of the privation which those suffer who labour under this

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disease, that they are almost entirely dependant upon the mercy and compassion of relatives or friends.

If an adult, (to which state our remarks throughout this essay have been more particularly applied) two, or three persons will always be required whenever it may be necessary to move or turn the patient; hence, considering the frequent drepings which are induced by the exciting diseases; the pain which the patient must necessarily suffer from lying on the back; how oft it may be necessary to move or shift the patient, to attend to the calls of nature, and how frequently the discharges from the want of control over the sphincters, may be passed involuntarily into the bed, taking, we say, all this into consideration, it will at once be evident, that the necessity to move or shift the patient will be frequent, and that the task of effecting these changes in the position of the

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patient, will, consequently, be very arduous and oppressive on those, whose lot it is to perform them, and very mortifying and humiliating to him, who is their subject.

These remarks naturally lead us to the consideration of another, and, what we consider, a very important part in the treatment of this disease, viz: a moveable machine: This is not only, considerable the necessity of hauling the patient out of bed, every time he may have an inclination to go to stool; but likewise to move or turn him into any desirable posture without pain or inconvenience, and with ease and facility to his attendants.

We are convinced that the cure of this complaint has been considerably retarded, and that much injury has oftentimes resulted to the patient from the want of some more convenient arrangements. Much labour and fatigue on the part

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of attendants and the exemption from many unpleasant duties are gained from their use.

The objects intended to be answered by these contrivances, are, that for the purpose of dressing the sheets he may be turned on either side and lifted from one part of the bed to another, and for ventilation or making the bed, he may be raised out of it in any desirable posture and again returned.

In cases, where from disease it has been necessary for persons to be confined for a long time, authors have hitherto been in the habit of recommending "Sir James Earles Bed", almost exclusively. Persons, however, who are thus confined, are apt, from lying on it any time, to become abraded it is extremely filthy, and in this, particular case does not answer the purpose for which it is designed.

I was in winter of 1842, at Dr Gibsons Lecture on fractures of the Os Femoris (that we were just

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made acquainted with the use of Jenks's Alleviator. In cases of fractures of this bone, where rest is so necessary, and motion so injurious, he described it as being extremely serviceable. It then struck me as being very applicable to my father's case, who was then labouring under a caries of the spine; I accordingly procured one and sent it home. The duties of attendants were not only much facilitated by it, but were also performed with less pain and inconvenience to the patient. It is applicable to all cases of confinement; still, however, it is deficient in some respects; its machinary is too complicated; too much time is required in arranging it for use: which renders it particularly objectionable in the present case.

These are objections which cannot be urged against one of more recent invention. I allude to "Bailey's improved bedstead". For convenience and comfort this certainly exceeds any thing of the kind

ever before offered to the public. This bedstead is so constructed that the head and body of the patient may be raised to any required height, and rest so as long as desired; and the lower extremities may be elevated or depressed to form any angle with his body, so that the patient may be put into any posture required for ease and comfort, from lying horizontally or flat, to sitting upright in a chair. From lying on his back, he may be turned on either side and upon any one part of the back another; and for the purpose of evacuation, or making the bed, he may be raised out of it in any desirable position and again returned. This and many other conveniences may be effected by a single person (or the patient may assist if he have the use of his arms), with much more ease than can possibly be done with hands.

That the attention of authors, who have so ably written on this disease, has not been more partic

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ularly directed to this subject is really a matter of astonishment! It is certainly, of immense importance, and worthy the particular attention of every one, who writes on this formidable disease. For of what avail is it, that we confine our patient to the recumbent posture for months, without suffering him to get up at all, if, for the purpose of evacuation, we unclothe and rudely drag him out of bed, roughly, we say, for this must always be the case from the hurry and confusion which is created on such occasions.

Immense injury must often result to the patient from this mode of proceeding. If the parts are beginning to coalesce and shreds of osseic matter are poured out, these, it must be evident, will be ruptured, and fresh irritation created.

This bedstead, then, from its combining, even imaginable convenience, with simplicity of structure, and economy of expense, ought to be received by every one who is afflicted with a caries of the

spine, or is, from other diseases, obliged to be confined to the recumbent posture for any length of time.

In regard to the various mechanical contrivances, which have been used to support the body and head, we have very little to say. They should not be used until there is reason to believe that the carious bone has been removed, and its place supplied by new bony matter; or that bony depositions have been thrown out in the neighbourhood of the diseased vertebræ in the form of splints or braces, sufficient to support the spinal column. Their use is therefore confined to that state of the disease in which the patient just begins to walk, or in other words, when although a bony union has taken place, it is not sufficiently strong to support the superincumbent weight of the body. If used before this, or in the early stage, they are capable of producing the effect for which they are designed, and we believe most

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if not all to be inadequate to this effect,) instead of doing good they must do harm: for 1st. the bony union which must be extremely tender and vacillating, if any has taken place, must be destroyed by the disuniting force of the machine; and 2ndly, by the irritation which will thus be created in the lining or the theca or membranes of the spinal marrow, increased, and the paralytic symptoms of the lower extremities consequently aggravated. Mr. Pott speaks thus of them, "Persons who have patience and fortitude to bear the use of them to such a degree as to affect the parts concerned, have always found increased pain and fever, and exasperation of all their bad symptoms, and, (observes Mr. Pott) I have known more than one instance in which the attempt has proved fatal."

The utmost degree of fortitude and of patience, on the part of the sufferer, and the most unwearied zeal and perseverance, on behalf of the pa-

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titioner, will, in all cases, be necessary, in order that these remedies may prove successful. Weeks and indeed months, sometimes pass away, without any alteration at all occurring in the symptoms; and years will, in many cases, be necessary, before a complete cure is effected.

I shall conclude this essay, by relating the following case which is remarkable throughout for its novelty, and, notwithstanding its unfortunate termination, may be looked upon as an instance in which the efficiency of the means made use of in the treatment of this disease is strikingly exemplified.

Case. My father, John Luther, aged 45, by profession a physician, of a robust and rethoric constitution, in the month of May, 1826, after being enfeebled and considerably emaciated by a chronic affection of the liver, was attacked with a dull obtuse pain in the dorsal

vertebra, and a numbness, or an uneasy tingling sensation in his legs. I not, however, suspecting the true nature of his case, but rather supposing it to be connected with, or to arise from, the liver affection, which was at this time greatly aggravated, all the remedies made use of at this conjuncture were prescribed with a view to relieve the morbid condition of that organ.

This course was pursued for some time, and as might well be imagined without producing any amendment in the symptoms of the disease, which was at this time existing in the spine. The increased pain in the back, the diminution of the natural temperature and animal sensibility of the lower extremities and the spasmodic contraction of the muscles, on the other hand clearly indicated that the morbid state of the spine, not only remained without being relieved, but continued to increase with increased force.

He ignorant as to the precise nature of the complaint, and unable at the time satisfactorily to account for these symptoms, little or nothing was done for it, except a blister over the part, with occasional cupping along the spine, which gave a temporary respite from pain, and seemed to check the rapidity with which the disease would otherwise have developed itself.

The pain in his side becoming more severe, his liver evidently enlarged, tortured with spasms at night, and finding his constitution materially injured, he resolved, in the month of August, to visit the York Springs, of this state, for the purpose of benefitting his health. Accordingly, contrary to our hopes, he returned with manifest injury instead of improved health. Wan, low spirited and desponding, more emaciated, the pain in his back more severe, an inclination to stoop forward, a peculiar limping

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across the scrobiculus cordis, with evident increase in his sensations of numbness and coldness in the lower extremities. In this situation he continued until the month of October, riding out in his gig to visit his patients one day, the next confined to the house, as if to repair the injury which had been done on the day before. By this time, the disease bore a more confirmed aspect, and the liver affection, that fruitful theme of former complaint, now gave way in his imagination as less tragic, in its event, than the lurking evil, which now proclaimed itself in the dorsal vertebræ. It was at this time that Dr. Forman one of his neighbouring physicians, was sent for, for the purpose of consulting upon his alarming case: nothing being heretofore done for the spinal disease, except cupping along the spine, with a variety, of local applications.

From the numbness and coldness of the lower

extremities, together with the other symptoms just enumerated, and from his having frequently declared (although he was considered erroneous and therefore always disuaded from such an idea) that a spinous process was unusually large and protuberant, and rather painful under pressure, the Dr. was induced to examine the spine, and accordingly found, as his patient had represented, the 7th dorsal vertebra, unusually large and prominent, with some tenderness under pressure. From his age, habit of body, being so different from that in which a caries of the spine is generally met with, & from his having long been the subject of a severe [illegible] the Doctor was inclined as were others, who saw him, to doubt the existence of any primary disease in the spine, conceiving it possible, that those symptoms, which apparently indicated a spinal caries were [illegible]

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of the derangement of the hepatic organs, & accordingly represented it as nothing but a natural deformity, or an exostosis; and, for a time, relieved the anxiety of his patient, by alleging, that the symptoms, which appeared to be indicative of a fatal [illegible], [illegible], [illegible], arising from the derangement of the hepatic apparatus, which was now decidedly of a serious nature. He therefore directed the following prescription, ℞. Aloes, Scammony, and Calomel, equal parts. M. ft Pills. Each pill containing six grains. [illegible] morning and evening.

The Doctor was prevailed upon, at the same time, by the solicitations of his patient, rather than from a conviction, on his part, of the absolute necessity, to establish the caustic issues on each side of the projecting bone.

This course was not pursued a long time, before an alteration was discovered, not only in the

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symptoms of the hepatic derangement, but also in the disease, which was about developing itself in the vertebral column. The pain in his side became less severe, his facal evacuations more regular and of a healthy colour, and his digestion in all respects better: and, as respects the disease of the spine, the want of sensibility, and the diminished temperature in the lower extremities, were now gradually restored, his carriage was more erect, and that distressing sensation of tightness across the stomach almost entirely removed.

Such was the benefit derived from the establishment of issues, which had only been of one months duration, and which discharged little or no pus during this time. But it unfortunately happened that at the end of this month, or rather more, the issues healed: and the symptoms now returned with redoubled violence, clearly and unequivocally proving the nature of his formidable disease.

He now, more particularly, complained of the tightness across the stomach, which he compared to a band drawn firmly around the body; the flatulency became extremely distressing; his tongue furred; urinary discharges frequent; small in quantity, and of a high colour; cheeks flushed; pulse tense and corded, and averaging about 95 in the minute; apt to trip and stumble in walking; his legs drawn across each other while sitting, and the numbness and coldness gradually increased; so that the control over the lower limbs was limited and imperfect. If an effort was made to stand or walk, he would either fall or stumble, or his legs drag, and such, moreover, was the paralysis which pervaded the muscular system of the inferior part of the trunk, that in sitting his body would fall forward, and it was only with the aid of crutches, or by a chair of peculiar construction that he was enabled to move to different parts of the room.

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The nature of his embarrassing case having evinced itself, by symptoms which could not well be mistaken, it now received that care and attention which its importance demanded. He was immediately placed in the horizontal position, and the caustic issues reestablished on each side of the diseased bone. The issues, however, from being improperly managed, discharged little or no pus during this time, (the beginning of December,) and the disease, in consequence, continued to get worse. Instead of being able to shift himself to different parts of the room by the remaining power which was left over the lower extremities, they now (the latter end of December) became completely paralysed, his faces and urine came away involuntarily, and he was confined exclusively to bed. By a frequent renewal of the caustic the issues were at length made to discharge. The purgative system was resorted to; but owing

to the inconvenience which attended its operation, from the want of better arrangements, it was by no means so rigidly pursued as was desired. With a views to relieve the morbid condition of the liver, his Physicians, Drs Forman, Attee, Winters, and Bruner, at the same time introduced a seton over the convex surface of this viscus; the nitro-muriatic acid bath was prescribed with a variety of other remedies unnecessary here to mention.

This course was faithfully and perseveringly used, during the remaining part of December, and almost the whole of January, 1871 without making any sensible impression upon the symptoms of the disease. At the end of this month, and in the beginning of February, however, it was first discovered, that this course of treatment, so steadily pursued, was effecting a change in the symptoms of his complaint. Sec-

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sibility was restored to his extremities, their temperature was more natural, he rested well at night, his appetite was good, and his spirits light and easy. The control over the sphincter of the bladder was also regained, and the 30th of January was the first time that he complained of pain from drawing the seton.

The same course was continued throughout January and the greater part of March, without any further sensible improvement in the symptoms. Rather discouraged with his present situation he was now thinking of availing himself of the advice of some more experienced physician, in addition to those already attending him. Dr McClellan, of Philadelphia, was accordingly requested to see him, who obligingly visited him in the latter end of March.

A more vigorous course of treatment was now agreed upon. The actual cautery was ap-

[illegible] each side of the dorsal vertebrae; dry cup[illegible] along the whole spine, sometimes above, and sometimes below the scapulae, with [illegible] every 2nd day. The moxa was applied every fourth day, alternately, on each side of the spinal column, until they extended as far down as the last lumbar vertebra. Having procured "Ten's alleviator" and subsequently one of "Bailey's improved bolusses", the purging could now be carried to its proper extent. To effect this purpose, the following prescriptions were made use of, at different times, ℞ Super Tart: Potass, ℥ Sulphur. ā ā ℥i, Pulv Salaptziij, mix. From one to two tea spoonful of this was given at night, about bed time, or early in the morning, every other day; Or, ℞ Magnesia, Rhubarb, and Ginger equal parts, by weight. Two large tea spoonfuls of this were given at a dose. A blue pill was likewise given at night, and the [illegible] in large quantities.

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The plethoric state of his system was such, that it likewise became necessary to put him under absolute restrictions as regarded his diet.

The diluted nitro-muriatic acid was rubbed in the legs with a sponge once or twice a day, and stimulating frictions were used frequently.

A hammock, which was constantly placed under him, and which by being attached to the alleviator instead of the belts, was used for elevating him from the bed, likewise enabled him to obtain the benefit of gentle gestation by being used as a swing.

The treatment, as previously pursued, appeared not to be sufficiently active to effect any further favourable change in the morbid condition of the diseased vertebra, and of the spinal marrow and its membranes.

Nature was already wearied in her struggles at restoration, and unless some more powerful

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and efficient means were resorted to, to rescue & repair the ruins of "the half disorganized and worn out structure of the spinal column and its curtilages"; these, incapable of sustaining their normal functional actions, must finally give way, and disorganization and cavitation, or ulceration, or sloughs or abscess eventually ensue.

Such an environment which was effected in the state of disease, by the plan of treatment which was now adopted, exceeded our most sanguine expectations. He had a copious, watery stool without the aid of medicine, but in a few days discharges were more solid and not so discoloured. His pulse, after some time became more soft and equable and regular, numbering about 84 in the minute; the flush of the cheeks gradually disappeared; and his tongue became moist, and in some measure, of a healthy appearance.

as regards the state of the lower extremities the rigidity of the muscles gradually subsided: he was able, after some time, to flex the foot without exciting the involuntary twitchings peculiar to this disease.

He likewise begun to exercise a slight degree of voluntary motion in the right foot, being enabled to move some of the toes: but this was so inconsiderable as scracely to be percehtible.

The rigidity grew less and less as this plan of treatment was pursued through April and May; and the voluntary power over the lower extremities likewise gradually increased, until by June he was enabled to flex and extend the feet, and also to throw into slight contractions the muscles of the thigh and leg.

June. Dr. McClellan now again visited him. The actual cautery was again applied on the right side of the excurvation, and the moxa

every 4th or 5th day. His pulse being frequent, but rather feeble, skin relaxed and appetite rather indifferent, which before had been remarkably good, he was directed to take a tablespoonful of the following infusion three times a day, ℞ Rad. Colombo; Rad. Rhei ℥ij, Aqua ℥viij. He was also suffered to be more generous in his diet. His legs were washed with the Rof. Spanish pepper, and frictions made use of with the flesh brush. The Decoctum and the Syrup de Cuisinier were taken as before.

The rigidity, which was looked upon as an evidence of the degree of inflammatory irritation existing in the spine, having wholly subsided in the right leg, and also in a great degree in the left, and being enabled to exercise a considerable degree of voluntary motion over the lower extremities, some of his physicians now consented to his setting up in a chair which was

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so constructed, that its back could be let down to any angle, and a step, which was attached to the fore part ~~part~~ of it for the purpose of resting the feet upon, was likewise so arranged that it could be heightened or lowered to any required distance: so that the chair could be converted into a perfect horizontal plane, enabling the patient from this mode of its arrangement, to obtain the benefits of the recumbent posture and, the chair being rocker, of gentle agitation, at one and the same time.

He was accordingly carried in a sheet from the bed in the chair, (its back being raised at an angle of about 40°) in which he remained during the greater part of the day; always replacing him whenever he felt fatigued or complained of much pain in his loins.

This temporary change from a state of long and constant confinement, and of some

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involuntary urgings, afforded him relief from pain, and a state of comparative comfort. Lamentation and despair now gave way to commendation and felicity; and instead of indulging in those gloomy forebodings, with which he was wont to look towards the event of his disease, he was enlivened, by the present flattering condition of things, with some degree of confidence and certainty as to his final recovery. But a sad disappointment awaited him! After having gone two weeks in this way, during which he felt no inconvenience from it excepting anasarca, and, when he continued up too long, painful sensations in the lower extremities, his stomach was observed to be considerably distended with flatulency, and the voluntary urine in the bladder appeared to be less than it had been before. The discharge from his bowels at this time, was not so profuse as it had been, and he laboured under a severe catarrhal affection; which, however, he had had some time

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before he had been carried into the chair.

When these symptoms were discovered to exist he was enjoined to remain in the recumbent posture. They, however, continued to increase; his abdomen was not only distended, but he complained of tightness across the stomach; his respiration was affected; his bowels rather torpid; urine sparing; pulse excited, tense, and corded; considerable œdema in the lower extremities, and the voluntary power over them totally lost. So that by this time June 23rd., what he had gained by so much trial and suffering was lost almost in a moment.

His bowels were now briskly moved with Jalap and Crem: Tart: and fresh irritation excited in the ipsus by the Savin ointment and slight application of the cantharides. He was also directed to be restricted to a rigid antiphlogistic regimen.

Dr. Ettlee, (of Lancaster,) visited him a week after his relapse. He applied the actual cautery on the

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left side of the projected vertebra, directed purging every other day and the moxas every 14th.

The discharge had been kept up previously to this, by confining the peas in the sore, made by the cautery, on the one side of the diseased bone, and in the moxas on the other; and by the suppuration of the moxa applied on each side of the spinal column.

Soon after a copious discharge had been procured from the back, and brisk purging followed up, he got rid of that unpleasant sensation of tightness across the stomach, and also of its distention consequently. The voluntary power over the lower extremities was also observed to be gradually returning.

July 13th. The caustic is applied in the cauterized surface on the right side of the spine. The voluntary power is considerably greater over the muscles of the lower limbs.

This course of treatment is continued through

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July and August with little or no variation, except such as is required by the access of particular symptoms.

Sept. 7. Recovered from the relapse which happened him on the 23rd of June. The power in his lower limbs is rather weaker than it was before the relapse, and his general health good.

The latter end of August a small ulcer formed on the right side of the projection, which communicated with the spinous process of the projecting bone. It was supposed, at the time, to be created by the caustic running from the issues, in which it had been applied, over the part in which the ulcer was situated. This with the pressure which the soft parts surrounding the projecting part of the spine necessarily sustained from constantly laying on them, together with the friction to which they were subjected by the motion of the protruding spinous process interiorally,

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was sufficient to account for the inflammation & subsequent ulceration. The inflammation finally extended to the periosteum, part of which was destroyed, and small portions of the external compact lamella of the sacrum necessarily in consequence came away; after which it healed.

Sept. 10th. All power in the lower limbs is lost, an imperfect command over the sphincters, with a retention of urine.

Severe counter-irritation is again established on the back, brisk purging pursued and his urine drawn off with the catheter.

Sept. 12th. The command over the urine and fæces is regained.

Sept. 16th. Is able to move the toes. Sept. 20th. Exercises some degree of voluntary power over the lower extremities.

October. By the latter end of this month, he had perfectly recovered from the relapse of Sept. 10th.

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Dr. McClellan now again visited him, and was highly gratified with his situation. He was able to flex the feet and legs, with ease and facility, likewise to draw them up slightly in the bed. & is general health was remarkable good at this time, and the muscles instead of being in that soft, flabby, and doughy state, in which they had been in for a long time before, had in some degree recovered their wonted tone and contractile firmness.

Plans were now suggested and devised for sitting him up and for exercise in the open air, which it was determined should be put into execution forthwith; but were unfortunately frustrated by his being attacked with a severe cough.

The cough continued through November, with little or no abatement; and the wounding power over the lower extremities was not ex-

served to be affected in any way until the [illegible] December [illegible] was utterly incapable of moving his limbs. He was obliged to draw off his urine with the catheter, and was in short in precisely the same condition, that he had been in during his former relapses.

These relapses, which it appeared were the rewards he could obtain from the painful and almost "barbarous" course to which he had subjected himself were, almost insuperable discouraging.

The treatment is pursued as before. Decem. 15th. he is enabled to pass his urine. 28th. Recovered from his relapse. January, 1828.

The discharge from his back is now kept up by the caustic drug and treatment pursued as before.

The spinal disease is evidently [illegible]

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state than it had been at any period since his confinement. He not only has a more perfect control over the flexors and extensor muscles of his leg, but the abductors and adductors are beginning to resume their natural functions. His appetite is good, his digestion healthy, his bowels regular, without the aid of medicine. His spine at the supposed diseased part firm & resisting. If he is raised in the bed to a sitting posture, by the contrivance constructed for that purpose, he experiences no inconvenience, nor any unpleasant sensations whatever.

February. He is seized with a violent cough for which we can assign no reason, as was the case at other times, except that it was from the irritation in the spine. It is tight & short, but is soon rendered loose by medicine. His pulse is frequent and corded, and his chest flushed; he was cupped several times without

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however deriving any sensible benefit from it. His cough is constant during the day and night, and his expectoration feeble and difficult. His appetite is impaired, and he has regular returns of fever. About ten ounces of blood were extracted from the arm; a tartar emetic plaster was applied to the chest; nitre & squill, combined was given in small doses, and the liq. ammoniacal. acetatis used as an expectorant. After having made use of this treatment sometime, he was attacked at times, mostly in the morning with a spasmodic constriction of the throat, which rendered his breathing extremely difficult and oppressive.

February 26th. It was now that the vitriolic solution was given while affected with it, a blister applied to the throat and one on each side of the chest. and he was overcome with an intolerable tickling cough.

March 1st. Respiration was laborious, an expression

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secretion of mucus, without the ability to expectorate it, extremities still cold, no, [illegible] pan to flag, the use of the volatile Julep was commenced, brandy toddy and other stimulants given, but all to no purpose; he grew weaker and weaker until 6 O'Clock in the evening, when he expired.

Post-Mortem Appearances. The 5th, 6th, and 7th dorsal vertebræ were taken from the rest of the spinal column. The 6th was then separated from the 5th and 7th. The inferior oblique processes of this bone were diseased; the cartilaginous surface, which, in a healthy state, applies to a similar surface of the superior oblique of the next vertebra (the 7th) was rough and carious: The cartilage being absorbed or removed, together with a considerable portion of the osseous substance of the process.

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The superior oblique processes of the 7th vertebra had the same appearances as the inferiors of the 6th, but there was not so much destruction of the substance of the processes as was observed in the 6th, but the cartilages were completely removed: the inferior oblique process of the 7th on the one side was carious and the cartilage absorbed. On the other side, the cartilage was highly injected with blood.

The cartilages covering, and, the ligaments connecting, the superior oblique processes of the 8th vertebra with the 7th had evident signs of inflammation.

In the joints formed between the oblique processes of the 8th and 9th vertebra there were slight traces of inflammation.

In the bodies of the vertebrae there was no apparent departure from the healthy state. The inter-vertebral cartilaginous substance

around the margin of the bones, was in a state of inflammation. This coloured appearance of the cartilage did not extend more than 1/16 of an inch into the joint between any two vertebrae.

The rib connected with the most diseased vertebra, which was the 7th, & on the side on which this bone was most injured, was enlarged at its head or articulation with the vertebra, and was irregularly enlarged at this place. Its connection with the transverse process was apparently in a state of inflammation.

The 7th dorsal vertebra had assumed its unnatural position in consequence of the destruction of its two superiour oblique processes; and of the two inferiour of the 6th, and probably in consequence of the diminution or absorption of the inter-vertebral substance between the anteriour parts of the bodies of the 6th and 7th ver-

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tebræ which from the long continued inflammation that existed in this part, I infer, must have taken place; but which, at the post-mortem examination, I was unable to detect from the laceration which this part had suffered from the cutting of the saw.

The 7th dorsal vertebra had slipped back in consequence of the disposition of the parts, and its spinous process advanced on that of the next or the 8th. The spinous processes had deviated from the line of the spinal column, or in other words looked to one side; which was very obvious when the integuments had been removed from the spinous processes. This is accounted for from the destruction of the inferiour oblique process of one side only of the 7th vertebra.

The pia-mater and arachnoid membranes were healthy

The dura-mater considerably thickened and

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The cellular tissue and adipose matter between the spinal marrow and bones were injected with blood.

The spinal ganglions had their neurilema injected very highly.

The spinal-marrow was natural.

This known, favoured for a long time before under a diseased development of the liver led to an examination of this viscus.

It appeared perfectly healthy, exhibiting no shade of recent inflammation: it had however contracted strong adhesions to the diaphragm.

The coverings of the ribs and their cartilages on both sides were neatly cut through, and the sternum and ribs raised up.

We were instantly struck by the unusual size and weight of the lungs, & by the thoracic affection.

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The lungs were excessively engorged, the bronchial tubes nearly obliterated, and clogged with a mucous effusion.

So great was this effusion that it could be pressed out of the lungs as we would water from a well steeped sponge.

The pleura was much thickened and semi-transparent strikingly resembling the sclerotic coat of the eye, both in thickness, colour and want of transparency.

The pleura pulmonalis adhered in almost its whole extent to the Pleura Costalis.

The pleura was obviously thicker in the neighbourhood of the spinal disease than in a more remote part. It indeed had a horny feel and roughness at this part.

Extensive adhesions existed between the pleura and lungs.

From three to four pounds of serum were confi-

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ned in the sac of the pleura, the colour could not be stated owing to its being changed by the fluid that escaped from the lacerated vessels along the spine.

The [illegible] and Bronchia were not examined, there was no doubt but that their mucous coat was inflamed, thickened, and loaded with mucus or mucus and serum combined.

The conclusions to be drawn from the history of the case are as follows;

1st, That the caries instead of being located in the bodies of the bones, as is ordinarily the case, had affected the oblique processes, which was preceded by inflammation and absorption of the cartilages.

2nd, That the degree or extent of the caries do not produce a corresponding variation in the attending symptoms; but that caries of the smallest extent, or any other irritation in

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the spine, capable of producing inflammation in the coverings of the spinal marrow and the neurilema of the nerves, will constitute as bad a case of caries of the spine, so called, as regards the effects which would be produced on the general health and limbs as a more extensive caries; and it is to this, viz. the inflammatory engorgement that we are to ascribe the importance of this disease. Although, as it respects the cure of this complaint, when the degree and extent of the caries are different in different subjects, the least (every thing else being equal) will be soonest relieved and cured; while the larger and more extensive will require more time.

3rd. That the symptoms, while living, as well as the appearances after death, prove, that great amendment had been effected in the general complaints; that the progress of the caries had been arrested; and that nothing,

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in case no other disease had supervened, rendered it either impossible or improbable that a final recovery could be effected.

4th. That the affection of the Spine had produced irritation and subsequently inflammation in the Pleura.

5th. That his constitution being debilitated and exercise of the body ~~being~~ precluded, this irritated and inflamed State of the mucous membrane of the lungs, instead of terminating in a moderate augmentation of mucous secretion, which, in a healthy and vigorous constitution would have been the case, terminated in the copious effusion of sero-mucous secretion, which produced suffocation and death

Dr Gibson